A.D. 1866, *26th May.* N° 1470.

Gas Pyrometers.

LETTERS PATENT to Baldwin Fulford Weatherdon, of 77, Chancery Lane, in the County of Middlesex, Civil Engineer and Patent Agent, for the Invention of "IMPROVEMENTS IN GAS PYROMETERS, WHICH MAY ALSO BE EMPLOYED AS THERMOMETERS."—A communication from abroad by Joseph Jean Marie Durand, of the Firm of Charles Leroy and Durand, of 25, Route de Fontainebleau, Gentilly, (Seine,) in the Empire of France, Candle Manufacturers, and Celestin Pichoin, of 100, Route d'Italie Paris, in the Empire of France, Chemist.

Sealed the 9th November 1866, and dated the 26th May 1866.

PROVISIONAL SPECIFICATION left by the said Baldwin Fulford Weatherdon at the Office of the Commissioners of Patents, with his Petition, on the 26th May 1866.

I, BALDWIN FULFORD WEATHERDON, of 77, Chancery Lane, in the County of Middlesex, Civil Engineer and Patent Agent, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN GAS PYROMETERS, WHICH MAY ALSO BE EMPLOYED AS THERMOMETERS," (a communication from abroad by Joseph Jean Marie Durand, of the Firm of Charles Leroy and Durand, of 25, Route de Fontainebleau, Gentilly, (Seine,) in the Empire of France, Candle Manufacturers, and Celestin Pichoin, of 100, Route d'Italie, Paris, in the Empire of France, Chemist,) to be as follows, (that is to say) :—

This Invention has for its object the measuring and ascertaining of the

temperature and elasticity or tension of any gas contained in a closed vessel, and consists of an instrument composed of glass tubes, shaped in like manner to a barometer, and furnished with a vessel formed of platinum or otherwise, capable of containing about a quart of nitrogen, the dilation of which gas is caused to exercise its pressure on mercury within a glass bulb or ball, so that the degrees of heat or otherwise can be readily ascertained and marked down through the medium of suitable graduations upon the glass, whereby great accuracy combined with simplicity is obtained.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Baldwin Fulford Weatherdon in the Great Seal Patent Office on the 23rd November 1866.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, BALDWIN FULFORD WEATHERDON, of 77, Chancery Lane, in the County of Middlesex, Civil Engineer and Patent Agent, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-sixth day of May, in the year of our Lord One thousand eight hundred and sixty-six, in the twenty-ninth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Baldwin Fulford Weatherdon, Her special licence that I, the said Baldwin Fulford Weatherdon, my executors, administrators, and assigns, or such others as I, the said Baldwin Fulford Weatherdon, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN GAS PYROMETERS WHICH MAY ALSO BE EMPLOYED AS THERMOMETERS," (being a communication from abroad,) upon the condition (amongst others) that I, the said Baldwin Fulford Weatherdon, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Baldwin Fulford Weatherdon, do hereby declare the nature of my said Invention, and in what manner the same is to be

performed, to be particularly described and ascertained in and by the following statement and the Drawings therein referred to (that is to say) :—

This Invention has for its object the employment of the variations of volume developed in gaseous or other bodies resulting from the various temperatures of the matter in which the said body is placed, whereby physical and mechanical effects are produced calculated to maintain an equal temperature in the said matter, and consists of a mercury thermometer, gas pyrometer, or otherwise, having two branches or tubes springing vertically from the bulb, in each of which said tubes platinum wires surmounted with silk, thread, or other insulating matter are so arranged in connection with electric piles and magnetic coils moving in conjunction with supply and discharge water taps, valves, air passages, or otherwise, as to admit of the said regulation being uniformly and accurately maintained.

But in order that my said Invention may be more fully understood and readily carried into effect, I now proceed to describe the same by the aid of the accompanying Drawings, reference being had to the letters and figures thereon marked (that is to say) :—

Fig. 1 represents a side elevation of the apparatus partly in perspective, shewing the construction thereof and mode of working the same; Fig. 2, enlarged detail views of the thermometer tubes, shewing the graduations thereon ; Fig. 3, a front view of a gas pyrometer upon my improved system ; Fig. 4, enlarged view of the socket plug and upper portion of one of the tubes in Fig. 3 ; Fig. 5, a vertical side view of a pyrometer which may be used as a thermometer; and Fig. 6, a side view of a weighing pyrometer partly in section. In each Figure the same letters of reference denote similar corresponding parts.

A, A, bulb of the thermometer ; B and B^1, graduated tubular branches as seen at Fig. 2 open at the upper ends ; C, C, mercury ; D and D^1, insulated platinum wires placed within the tubular branch B, communicating with the electric pile E, E, and electro-magnets F, F ; G, G, horse-shoe hammer magnets for putting the apparatus in motion ; H, H, copper blocks on which the hammer falls when not attracted ; I, I, levers worked by the magnetic hammers aforesaid upon the stands or bearings J and J^1 ; K, K, cords for communicating motion to the water valves L, L ; M and M^1, platinum wires placed within the branch B^1, in communication with the electric piles N and N^1, and the electro-magnets O and O^1 ; P, P, elastic blade attached to Q of the electro-magnet O ; R, R, spring against which the elastic blade reacts S, S, tank charged with water ; T, T, tank for supplying the same ; U, U, water line ; V, V, float or water guage. W, W, ratchet wheel and axle gear

for opening or shutting the valve X or otherwise through the rise and fall of the float V, pulley cords and counterbalance weight Y and Y^1; Z, Z, pulleys on which the cords work.

In Fig. 3, *a*, *a*, is a vessel charged with dry nitrogen or azote having a tube *b*, *b*, projecting therefrom communicating with a syphon tube b^1 and b^2, charged with mercury *c*, *c*, into which the insulated conductors *a*, *e*, and *f*, *g*, are placed; *h*, *h*, socket plug or cap for securing the said conducting wires within the tubes.

In Fig. 6, *i*, *i*, weighing cylinder; *j* and j^1, piston rod and weight; *k*, *k*, gas chamber; *l*, *l*, passage through which the expanding gas passes to the weighing cylinder.

The action is as follows:—By placing the bulb of the thermometer A, Fig. 1, within the heated fluid body or matter to be regulated, the mercury *c* is caused to ascend within the tubes B and B^1, and by touching the ends of the wires D and D^1, M and M^1, arranged to any suitable graduations within the said tubes, the electric current is put in motion and the magnetic hammers G attracted or repelled so as to raise the levers I, and thereby actuate the valves in the tanks for the supply or discharge of the water to or from the same, whereby the ratchet wheel is put in motion, and the damper opened or closed for the purpose of increasing or diminishing the heat beneath the matter to be regulated, by which an uniformity of temperature in the same is maintained.

In conclusion to the foregoing description I would here note that in connection with the above system common thermometers may be applied to the self-regulating apparatus in like manner to the above, and formed wholly or partly of glass, china, or platinum as may be found suitable.

And I would further note that I also employ dry nitrogen or azote, within platinum vessels before described as an expanding medium for bringing the mercury in contact with the wires before mentioned in lieu of glass and mercury, being less subject to fracture or otherwise by greater or less heat.

And I would again further note that the above principle with modifications is also applicable to other purposes than those above enumerated such as for clockwork, alarums, or otherwise, employing in like manner the mercury or gas bulb "which is termed the monitor," in connection with the electric piles and magnets "termed the messenger," and the hydraulic system "termed the motor."

Having now fully described and ascertained the nature of this my said Invention, and the manner in which the same is to be performed and carried

into effect I would have it clearly understood that I do not intend to confine myself to the precise details herein-before described as the same may be otherwise varied without departing from the general principle of this my said Invention, nor do I claim as new and of the said Invention the exclusive use of the several parts, combinations, and processes herein-before described, except when the same are employed in and for the purposes of my said Invention which I hereby declare to consist,—

Firstly, in using the variations of volume developed in a body through the various temperatures of the matter in which the said body is placed, whereby an uniform and equal temperature in the said matter is maintained.

Secondly, in the combination and employment of thermo-pyrometers with electric apparatus.

Thirdly, in the electro-magnetic power or messenger for actuating the motor through the medium of levers.

And, fourthly, in the combination and mode of employing clockwork, alarums, or other appliances in connection with the electric self-regulating system in the manner and for the purposes herein-before set forth and described.

In witness whereof, I, the said Baldwin Fulford Weatherdon, have hereunto set my hand and seal, this Twenty-third day of November, in the year of our Lord One thousand eight hundred and sixty-six.

B. F. WEATHERDON. (L.S.)

Witness,

R. H. P. Cooke,

Clerk to Messrs. Weatherdon & Co.,

77, Chancery Lane.

LONDON:

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Printers to the Queen's most Excellent Majesty. 1866.

A.D. 1866, May 26, N° 1470,
WEATHERDON'S SPECIFICATION.

FIG. 1.

FIG. 3.

FIG. 5.

FIG. 6.

FIG. 2.

FIG. 4.

The tiled drawing is partly colored

Drawn on Stone by Malby & Son

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